

What is Claimed is:

1. An electronic chip device comprising an interface support film including a support film and at least one flat conductive interface placed on the support film, said interface support film having such properties that it is capable of being creased or folded over onto itself without deterioration, and a microcircuit connected to the interface.

2. An electronic chip device comprising an interface support film including a support film and at least one flat conductive interface placed on the support film, a microcircuit connected to the interface, and a compensation film placed on the support film, said compensation film having a recess containing said microcircuit, its connections and an encapsulating material.

3. The device according to claim 1 further including a compensation film placed on the interface support film, said compensation film having a recess containing said microcircuit, its connections and an encapsulating material.

4. The device according to claim 1 wherein the support film and the interface can be creased or folded together with a curve radius of less than 2.5 mm without deterioration.

5. The device according to claim 4, wherein said curve radius is less than 1 mm.

6. The device according to claim 2 wherein the encapsulating material is contained at least partly by said recess.

7. The device according to claim 1 wherein the support film has a thickness of less than 75 μm .

Sub B2 8. The device according to claim ¹⁹7 wherein the support film has a thickness between 10 μm and 30 μm .

5 9. The device according to claim 1 wherein the support film has at least one of an elongation at break of more than 80%, a Shore hardness of less than 80, a vitreous transition temperature T_g of less than 0°, and a fusion temperature of less than 130°C.

10 10. The device according to claim 1 wherein the support film is made from a material selected from the group comprising PP, PE and PET.

11. The device according to claim 1 wherein the interface is aluminum.

12. The device according to claim 1 wherein the interface comprises turns of conductive material and the microcircuit is placed outside the turns.

Sub B3 15 *Sub B4A* 13. The device according to claim 1 wherein the support film comprises a strap on the face of the film opposite the microcircuit to pull back at least one end of the interface in the vicinity of the microcircuit.

20 14. The device according to claim 1 wherein the interface comprises turns of conductive material and the width of the turns around the microcircuit are thinner than elsewhere in such a way as to connect the microcircuit directly on the ends with a small length of connecting wire.

15. The device of claim 1 wherein the interface comprises turns of conductive material and the microcircuit is placed between the turns directly over the support film.

16. The device of claim 1 wherein the interface comprises turns of conductive material and the microcircuit is placed in a corner of the support film and directly above the support film.

17. The device according to claim 1 wherein the interface has at least one antenna turn formed in such a way as to be able to communicate over a distance of more than 8 cm.

18. The device according to claim 17 wherein said antenna is formed such that the device can communicate over a distance more than 50 cm.

19. The device according to claim 1 wherein the interface has connection pads.

20. The device according to claim 1 further including an encapsulating material over at least the microcircuit, its connections and a portion of the interface.

21. The device according to claim 1 further including at least one of a protection/personalization film and an adhesive film over at least one of the faces of the device.

22. The device according to claim 1 further including a resonance capacitor made up of two conductive plates placed on respective sides of the support film.

Sub B6 5 ¹⁶ 23. The device according to claim ¹⁵ 22 wherein the capacitor has an adjustment facility.

24. The device according to claim 1 wherein the microcircuit contains at least one of an integrated capacitor and an emergency antenna.

Sub B7 10 ¹⁸ 25. The device according to claim ¹⁷ 24 wherein the microcircuit is powered and can communicate at close range via the emergency antenna if the interface of the support film fails.

15 26. A chip card comprising a card body on which an electronic chip device is fixed, the card body having an area greater than or equal to that of the device, said electronic chip device comprising an interface support film including a support film and at least one flat conductive interface placed on the support film, said interface support film having such properties that it is capable of being creased or folded over onto itself without deterioration, and a microcircuit connected to the interface.

27. The chip card of claim 26 wherein said card body has an area which is at least double that of said electronic chip device.

20 28. The chip card of claim 26 comprising two external films between which the electronic chip device is sandwiched.

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~~28~~. The chip card of claim ²⁶~~28~~ wherein one of said external films forms said card body.

30. The chip card of claim 26 wherein said card body has a cavity and the microcircuit is located in the cavity, and wherein the support film and the interface extend outside the cavity over the surface of the card body.

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31. A process to manufacture an electronic chip device, comprising the steps of providing an interface support film including a support film and at least one flat interface, said interface support film provided having such properties that it is capable of being creased or folded without deterioration;

10 affixing at least one microcircuit on the interface support film; and connecting the microcircuit to the interface.

32. A process to manufacture an electronic chip device, comprising the steps of providing an interface support film including a support film and at least one flat interface;

15 affixing at least one microcircuit on the interface support film; connecting the microcircuit to the interface; and affixing a compensation film on the support film, said compensation film having at least one recess corresponding to a place for a microcircuit.

20 33. The process according to claim 31 further including the step of affixing a compensation film on the support film, said compensation film having at least one recess corresponding to a place for a microcircuit.

34. The process according to Claim 33 wherein the step of affixing the compensation film is carried out before the microcircuit is fixed to the support film.

5 35. The process according to claim 33 further including the step of depositing an encapsulating material only within the recess of the compensation film.

36. The process according to claim 33 wherein the step of affixing the compensation film is carried after the microcircuit is fixed to the support film.

10 37. The process according to claim 31 wherein the interface support film is provided in strips on a roll, and the support film is transported to at least one work station by a transport means that is controlled by the tension of the support film.

38. The process according to claim 31 wherein the microcircuit is connected to the interface by ultrasonic welding of conductor wires.

15 39. The process according to Claim 38 wherein said conductor wires are made of aluminum.

40. The process according to claim 38 wherein, during said welding, at least the area of the support film on which the microcircuit is located is placed on a firm reference surface.

20 41. The process according to claim 40 wherein the support film is placed on the reference surface by means of suction.

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42. The process according to claim 31 wherein the interface is created on the support film by an aluminum engraving technique.

5 43. The process according to claim 31 further including the step of connecting interface elements to contact pads through the support film by mechanical perforations.

44. The process according to claim 31 further including the step of placing an encapsulating material at least over the microcircuit and its connections.

10 45. The process according to claim 31 further including the step of applying an adhesive layer with a peelable protection film on at least one face of the device.

15 46. The process according to claim 45 wherein the adhesive layer with the protection film is provided in continuous strip, and the support film comprises a strip with a plurality of interfaces, and wherein the devices are cut from the strips while remaining fixed on the protection film, and a cleaning up operation is carried out between the devices.

47. The process according to claim 37 wherein each strip has a number of interfaces, and further including the step of cutting each device.

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